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Dladla, Khumbuzile and Khobai, Hlalefang

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The impact of Taxation on Economic Growth in South Africa

Dladla Khumbuzile

Department of Economics, Nelson Mandela University

s213388324@mandela.ac.za

Hlalefang Khobai

Department of Economics, Nelson Mandela University

hlalefangk@gmail.com

ABSTRACT

This paper investigates the impact of taxation on economic growth in South Africa. Yearly data for South Africa for the period 1981 – 2016 was used to develop the Auto-Regressive Distribution Lag (ARDL) approach. The empirical results confirm that there is a negative relationship between taxes and economic growth in South Africa. The findings of the study include that economic growth, trade and openness, capital and taxes are co-integrated. This paper suggests that fiscal policy is very important to force sustainable economic growth in South Africa.

Keywords

Taxation, Economic growth, Auto-regression Distribution Lag Model (ARDL), Co-integration, South Africa.

JEL: C1;E27;H2;

INTRODUCTION

Economic growth can be defined as the annual rate increase in total production or income in the economy (Poulson, 2008). Taxes are a proportion of income or consumption of a country's population. This led to many studies aiming to determine whether there is a long run relationship between economic growth and taxation. The studies carried out on this notion differed across countries, different data usage, the methodologies as well as the different period of study. Most of the studies evidenced a negative relationship between economic growth and taxation (Poulson 2008). This is on account that income tax affect incentive to work and as a result will affect productivity negatively.

Taxes can increase the cost of capital and reduce incentives to invest, to the point that high tax rates discourage investments thereby adversely affecting economic growth (Ferede & Dahlby, 2012). Taxes also affect the decisions of households to save, supply labour and invest in human

capital. Individuals substitute activities taxed at high rates for activities taxed at relatively lower rates. This is mainly because high tax rates lead individuals to reduce working hours, engage in less productive economic activity or exit the labour market which would then result in lower rates of economic growth (Poulson & Kaplan, 2008). According to Dalamagas (2008), high taxes affect the hours worked per self-employed in all of the sample countries negatively. This is the problem identified in this study and it is prevalent or costly because the disincentive to work affects the overall growth of the economy.

The South African economy has experienced a significant transformation since the advent of democracy. South Africa has achieved an average rate of economic growth of 3.3% per year in real terms over the period 1994 to 2012, an exceptional improvement on the average annual growth of 1.4% during the period 1980 to 1993 (Industrial Development Corporation, 2013). The South African tax system was resilient during and post the 2008 global financial crisis. However, the pace of growth fell somewhat short of the 3.6% average recorded by the world economy (Industrial Development Corporation, 2013). In the 2014 and 2015 fiscal year tax revenue that was collected amounted to R986.3 billion and grew by R86.3 billion (9.6%), this growth was supported by personal income tax and value added tax which grew by 13.9% and 9.9% respectively (South African Revenue Service, 2015). The gross domestic product of South Africa by 2012 was 77% larger in real terms relative to 1994, with the corresponding rise for the global economy having been 90%.

It can be realised that since the advent of democracy in South Africa, tax revenue and economic growth have been experiencing an upward growth trajectory in absolute terms. This study therefore seeks to determine whether there is any relationship between economic growth and taxation in South Africa using the autoregressive distributed lag model (ARDL).

The remaining of this paper is structured as follows; section two gives a brief review of the literature followed by section three which focuses on the data and the methodology. Section four present the findings and interpretation of the results. The last section concludes the study and provides recommendations.

LITERATURE REVIEW

Many studies have examined the impact of taxation on economic growth, given that the issue of taxation and economic growth are at the heart of macroeconomic policies. This part of the paper focuses on the key properties of the selected empirical studies investigating the relationship between economic growth and taxes. The literature review will not be limited only

to South African studies but will also focus on divert of results in terms of causality, irrespective of the geographical area. Examination of the causality between economic growth and tax is a topic of numerous debates, however, without the agreement on a unified theoretical approach.

At the forefront of the analysis and mutual dynamic of these variables was Skinner (1987). This study investigated the relationship between taxes and economic output using cross data and established that there is a negative relationship between taxes and economic growth. The other studies that established a negative relationship include: Dowrick (1992), Easterly and Rebelo (1993), Badri and Allahyari (2013), Zellner and Ngoie (2015), Seward (2008), Canicio and Zachary (1975), Lee and Gordo (2005), Atems (2015), Ojede and Yamarik (2012), Dackehag and Hansson (2012), Szarowska (2010) and Stoilova (2017).

Dowrick (1992) carried a study for a sample of Organisation for Economic Co-operation and Development (OECD) countries between 1960 and 1985 and established a strong negative effect of personal income taxation, but no impact of corporate taxes. Easterly and Rebelo (1993) found some measures of the tax distortion (such as an imputed measure of marginal tax rates) to be correlated negatively with output growth, although other measures of the tax distortion were insignificant in the growth equations.

Badri and Allahyari (2013) analyses the effects of tax and gross domestic product on employment in Iran during the years 1976-2007 based on the autoregressive distribution model (ARDL). The results obtained from the estimation of long-term and short-term pattern reveal that tax has a negative and significant effect on employment and gross domestic product has a positive and significant effect on employment

Zellner and Ngoie (2015) also conducted a study of the impact of tax on economic growth using the Marshallian macroeconomic model in the United States between the period 1987 to 2008. The findings were that corporate taxes are harmful to economic growth. Seward (2008) conducted a study of the effects of taxes on economic growth in industrialised countries for the period 1965 to 1995. The findings were that taxes are negatively correlated with economic growth.

Canicio and Zachary (1975) explored the effects of taxation in Zimbabwe over the period 1980 to 2012 using granger causality test and vector error correction model to test the relationship. The results show that taxes affect the allocation of resource and distort the growth of the economy

Lee and Gordo (2005) examined the relationship between the tax structure and economic growth using cross-country data during 1970 to 1997. The findings suggested that statutory corporate tax rates are significantly negatively correlated with cross-sectional differences in average economic growth rate and that increases in corporate tax rates lead to lower future growth rates within countries

Atems (2015) explored the study of the effects of taxation on economic growth both in the long- and short-run in 48 states in the United States over the period 1967 to 2008 using the partial durbin model. The results show the evidence of short- and long-run relationship between taxation and economic growth and indicates that a 1% increase in tax will reduce economic growth by 0.33%. Another study in the United States by Ojede and Yamarik (2012) carried out the research of the long- and short-run relationship between tax policies and economic growth in 48 states from the period 1967 to 2004 using error correction model. The findings were that personal income has a significant effect on economic growth while taxes on corporate have a negative impact

Dackehag and Hansson (2012) explored the study of taxation of income and economic growth in the 25 rich OECD Countries using the panel data from 1975 to 2010. The results show that both corporate taxation and personal income tax negatively influence economic growth. However, the correlation between corporate income and economic growth is more robust.

Szarowska (2010) conducted a study of the changes in taxation and their impact on economic growth in the European Union. The author performed his analysis on adjusted annual panel data of twenty-four European Union countries in the period 1995 to 2008. The results verify the statistically significant negative effect of tax burden on GDP growth, also emphasises that estimations confirm a statistically significant negative effect of direct taxes on GDP growth as well. The author mentions that a cut in the direct tax quota by 1% raises the GDP growth rate by 0.43% based on the results.

Stoilova (2017) carried out the research of exploring the relationship between tax structure and economic growth focusing on the 28 European Union countries from 1996 to 2013. The author used Barro's endogenous model and found that total revenue has an effect on the economy. The researcher found that personal income tax have positive impact on economic growth, while corporate taxes have a negative impact on growth.

Though most of the studies and theory underlines a negative relationship between economic growth and taxation, empirical research reveals that some studies found a positive relationship (namely, Orcan 2009; Babatundel, Ibukun & Oveyemi 2017; and Tosun and Abizahed 2005)

Orcan (2009) investigated the impact of fiscal policy on economic growth in South Africa using the vector auto-regression (VAR) modelling. The findings reveal that tax revenue is positively related to economic growth. However, tax implemented alone takes a considerably long period to impact economic growth.

Babatundel, Ibukun & Oveyemi (2017) conducted a study to examine the relationship of taxation and economic growth in Africa from the periods 2004 to 2013. The pre-estimation test carried out was descriptive statistics and unit root tests, which showed that the variables GDP and tax were normal and stationary. However, the findings however for this study indicated that tax revenue is positively related to GDP and promotes economic growth in Africa. The study concluded that tax revenue has a significant positive relationship with GDP. Skinner (1988) used data from African countries to conclude that income, corporate, and import taxation led to greater reductions in output growth than average export and sales taxation

Tosun and Abizahed (2005) studied the relationship between tax policies and economic growth in 21 member nations of the Organisation for Economic Cooperation and Development (OECD) over the period 1980 to 1999 using the random effect model (REM). The result reveals the evidence of the relationship between taxes and economic growth, with positive and significant results on personal income tax and corporate tax

Finally, some studies evidenced no relationship between taxation and economic growth (Myles 2000; Xing 2012; and Ojong, Anthony and Arikpo 2016). Myles (2000) examined the effect of taxes on economic growth in the United Kingdom from the period 1950 to 1998 using exogenous growth model and endogenous growth model. The finds show that the relationship between tax and economic growth is very weak and in practise taxation does not affect the rate of growth. A similar study was embarked upon by Xing (2012) to examine the link between taxes and economic growth in 21 OECD countries over the period 1970 to 2004 using the error correction model. The study however, show corporate and personal tax to be insignificant.

Ojong, Anthony and Arikpo (2016) undertook the study of investigating the impact of tax revenue on economic growth in Nigeria over the period 1986 to 2010 using the ordinary least square model. The findings of their ordinary least square model reveal the insignificant relationship between tax revenue received from companies and economic growth.

Though, theoretical literature underlines an inverse relationship between taxation and economic growth, the empirical studies considered above showed the results are mixed; negative, positive to no relationship. In short, there is no consensus on the size and the sense of the linkage between taxation and economic due the ambiguity of the nexus between these variables. This study therefore uses one of the recent models, the ARDL bounds test technique to examine the dynamics between the two variables for the case of South Africa.

3. METHODOLOGY

In this study the impact of taxation on economic growth in South Africa is analysed using the annual data over the period 1981-2016. Different sources have been used to gather data of the variables that are used for this study. GDP and Tax were collected from the South African Reserve Bank. Trade openness and Capital data was gathered from the world bank development indicators. The dependent variable is GDP while Trade, Tax and Capital are independent variables for this study and all these variables are expressed in logarithm form.

The model used in this study is an econometric model, which runs a multiple regression analysis between gross domestic product (dependent variable) and the variables that affect economic growth such as taxation, capital and openness (independent variables). The independent variables in the model are proxy variables.

$$\text{Linear regression equation} \quad \ln GDP_t = \alpha + \beta_1 LTX_t + \beta_2 LTR_t + \beta_3 LK_t + u_t \quad (3.1)$$

GDP_t = Gross domestic Product

TX_t = Tax on income, profits, capital gains (as a percentage on total revenue)

TR_t = Trade openness (Imports plus exports)

K_t = Capital (fixed capital formation)

α = Constant

β_1, β_2 and β_3 = Slope Coefficients

The first step in examining the long run relationship between the variables is to test whether the variables are stationary or non-stationary. To examine the non-stationarity property of the series variables both in the levels and in the first difference, the Augmented Dickey Fuller (ADF) test has been employed. This test is the modification of the Dickey Fuller (DF) test and

the lagged values of the dependent variables are added in the estimation of an equation as follows:

$$\Delta Z_t = \theta + (\rho - 1)Z_{t-1} + \gamma T + \delta \Delta Z_{T-1} + \varepsilon_{2t} \quad (3.2)$$

The Phillips and Perron (PP) test is also employed in the empirical analysis. This is on account that the ADF tests does not consider cases of heteroscedasticity and non-normality which are mostly realized in raw data of economic time series variables. The PP test also has power when the time series of interest has serial correlation and there is structural breaks. The PP test is based on the following form of equation:

$$\Delta Z_t = \theta + (\rho - 1)Z_{t-1} + \gamma(t - \frac{T}{2}) + \delta \Delta Z_{T-1} + \varepsilon_{3t} \quad (3.3)$$

In order to investigate the linkage between economic growth and taxation in South Africa, the study applies the ARDL bounds testing approach to co-integration developed by Pesaran, Shin and Smith (2001). The ARDL co-integration technique is used in determining the long run relationship between series with different order of integration (Pesaran & Shin, 1999, & Pesaran et al. 2001). Modelling time series can be done through co-integration to keep long-run information intact. Co-integration is an econometric concept that mimics the existence of a long-run equilibrium among underlying economic time series that converges over time. One of the advantages of ARDL approach is that when there is a single long run relationship, the ARDL procedure can distinguish between dependent and explanatory variables. That is, the ARDL approach assumes that only a single reduced form equation relationship exists between the dependent variable and the exogenous variables (Pesaran, Smith, & Shin, 2001). This model has become more popular in recent studies. In simple form, the ARDL model involves estimating the following conditional error correction models:

$$\begin{aligned} \Delta LGDP_t = & \alpha_1 + \alpha_T T + \alpha_{GDP} LGDP_{t-1} + \alpha_{TX} LTX_{t-1} + \alpha_{TR} LTR_{t-1} + \alpha_K LK_{t-1} + \\ & \sum_{i=1}^p \alpha_i \Delta LGDP_{t-i} + \sum_{j=0}^q \alpha_j \Delta TX_{t-j} + \sum_{k=0}^r \alpha_k \Delta tr_{t-k} + \sum_{s=0}^s \alpha_s \Delta K_{t-s} + \varepsilon_{1t} \end{aligned} \quad (3.4)$$

Where Δ is defined as the first difference operator, and T in the equation is the time trend, $\Delta LGDP_t$ is the natural log of gross domestic product, $logTX_t$ is the natural logarithm of taxation, $logTR$ is the natural logarithm of trade openness and $logK_t$ is the natural logarithm of capital.

The bound test procedure is based on the F-test for investigating the presence of the long run linkage and it tests for the joint significance of lagged level variables involved. The null hypothesis of nonexistence of cointegration for the equation is as follows; $H_0: \alpha_{GDP} = \alpha_{TX} = \alpha_{TR}$

$= \alpha_K = 0$ tested against the alternation hypothesis $H_1: \alpha_{GDP} \neq \alpha_{TX} \neq \alpha_{TR} \neq \alpha_K \neq 0$. If the calculated F-statistics exceeds the upper critical bound value, then the H_0 is rejected and the results conclude in favour of co-integration. On the contrary, H_0 cannot be rejected if the F-statistics falls below the lower critical bound value. Finally, if the F-statistics falls within the two bounds, then the co-integration test becomes inconclusive.

4. FINDINGS OF THE STUDY

4.1 Unit root tests

The results of the ADF and PP tests for stationarity are illustrated in Table 1. The t-statistics for all the variables (GDP, Capital, Trade openness and Tax on income) are greater than the critical values at 1%, 5% and 10% levels of significance, respectively for both ADF and PP tests. This indicates that the null hypothesis of unit root hypothesis cannot be rejected, implying that all the variables are non-stationary at level form in Table 1. The findings of the first difference suggested that all the variables are stationary at 5% level of significance in Table 1

Table 1: Unit root test results

Variable	Levels		First difference	
	ADF	PP	ADF	PP
LGDP	-2.12	-2.25	-3.95**	-.389**
LK	-2.38	-3.99	-4.66*	-4.59*
LTR	-3.50	-3.56	-5.00*	-5.34*
LTAX	-3.24	-2.60	-5.29*	-9.98*

Values marked with a * represent stationary variables at 1% significance level, and ** represent stationary at 5% and *** represent stationary variables at 10%.

Source: Author's own calculations

4.2 Bounds test to Co-integration

The results for the ARDL bound test are illustrated in Table 2. The F-statistics 8.53 is greater than the critical bound values at all significant levels (1%, 5% and 10%). This means that the variables are co-integrated at level 1%, 5% and 10%. Therefore, this suggest that the overall results exhibit three co-integration. Indicating that there is a long run relationship between trade openness, tax on income, capital and gross domestic product in South Africa.

Table 2: Bound test

Test statistic	Value	Significant	I (0)	I(1)
F-statistics	8.531914	1%	3.65	4.66
k		5%	2.79	3.67
		10%	2.37	3.2

Source: Author's own calculations

4.3 Estimation Results of Long-run and Short-run Elasticities

The results exhibit that capital has a long run positive effect on economic growth and is significant at 1% (see Table 3). In other words a 1% increase in capital is expected to increase economic growth by 0.20%, ceteris paribus. The results are in line with the findings of Khobai, Abel and Le Roux (2016) who established that an increase in capital is expected to increase economic growth, also stated that there is a long run positive effect between capital and economic growth.

The results further portray a negative long run relationship between taxes and economic growth. The results exhibit that a 1% increase in taxes is expected to decrease economic growth by 0.01%. This is in line with the findings of Atems (2015), Stoilova (2017) and Badri and Allahyari (2013) who have established that higher taxes have a negative impact on economic growth in 48 states of United States, 28 European Union countries and Iran, respectively. The results of the relationship between trade openness and economic growth show a positive long run relationship between them and is also significant at 1% level of significance. The results portray that a 1% increase in trade openness is expected to increase economic growth by 0.49%, ceteris paribus. This confirms the results found by Khobai, Abel and Le Roux (2016)

Table 3: Long Run results

Variable	Coefficient	t-Statistic	Probability
C	9.64	15.39	0.0013
LCapital	0.20	3.55	0.00
LTrade Openness	0.49	7.68	0.00
LTax on income	-0.01	-2.78	0.0093
R^2	0.99		
DW	1.31		

Source: Author's own calculations

Table 4 discusses the short run results. The impact of capital on economic growth is found to be negative and not significant at all levels of significance. The short run results also show that trade openness have positive impact on economic growth and are not significant at all levels of significance. The results of taxes on economic growth still shows a negative impact and are significant at 5% level of significance.

The estimate of the ECM(-1) is -0.12. For the results to support a long relationship, the ECM should be negative and significant. The results in Table 4 show that the ECM is negative and significant at 5% level of significance. This means that it supports the long run relationship among the variables. The results indicate that the short run deviations from long run equilibrium are corrected by 12.24% towards long run equilibrium each year.

Table 4: Short Run results

Variable	Coefficient	t-Statistic	Probability
C			
LCapital	-0.026	-1.26	0.21
LTrade Openness	0.0342	1.696	0.10
LTax on income	-0.0038	-2.207	0.03
ECM (-1)	-0.1224	-1.99	0.05

Source: Author's own calculations

4.4 Short-run diagnostics

The diagnostic test results are illustrated in Table 5. This study uses the Breusch-Godfrey test to test for serial correlation, since the p-value of the serial correlation test is insignificant, so this implies that there is no serial correlation in the residuals of the model. The Breusch-Pagan-Godfrey test is used to test heteroscedasticity in this study; the p-value is insignificant, and this implies that there is no heteroscedasticity in the residuals of the model. The last part of diagnostic test is the test of normality and the results shows that the p-value of Jarque-Bera is greater than 0.1, so this implies that the residuals are normally distributed. The short run models were found not to be spurious because the Durbin-Watson statistics was found to be greater than the R^2 .

Table 5: Diagnostic Test

	F-statistic	Probability
BG Serial Correlation test	1.54	0.23
BPG Heteroskedasticity test	1.62	0.16
Normality	0.167	0.92

Source: Author's own calculations

4.5 Stability Tests

The stability of long run parameters is examined by applying cumulative sum of recursive residuals (CUSUM) and CUSUM of recursive squares (CUSUMSQ). Figure 1 and 2 demonstrate cumulative sum of recursive residuals. The null hypothesis cannot be rejected at 5% level of significance if the plot of test falls within the critical limits. It can be concluded that short run and long run estimates are efficient and reliable because figure 5 and 6 illustrates that the test lie between the upper and lower critical limits. This implies that there is stability in the model.

Figure 1: Plot of cumulative sum of recursive residuals

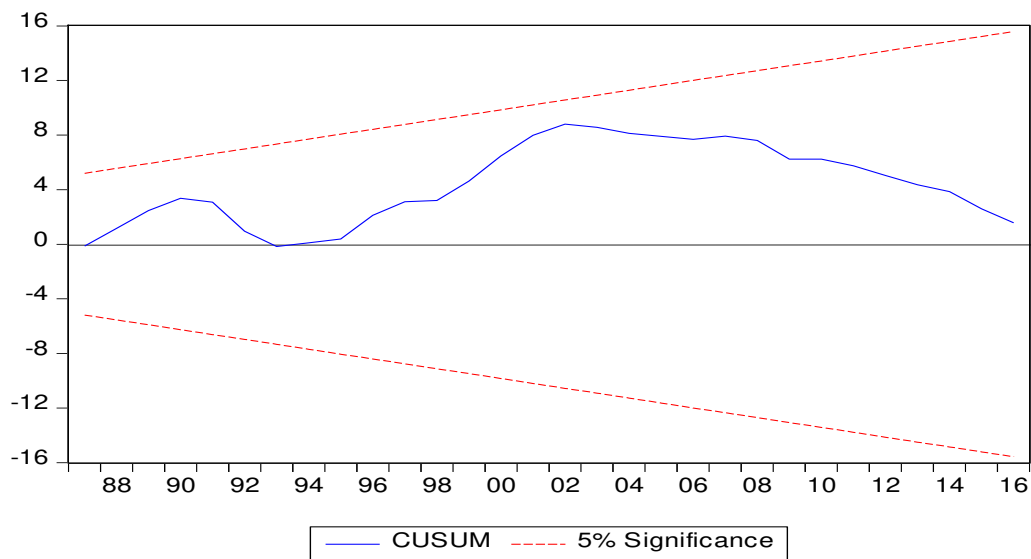
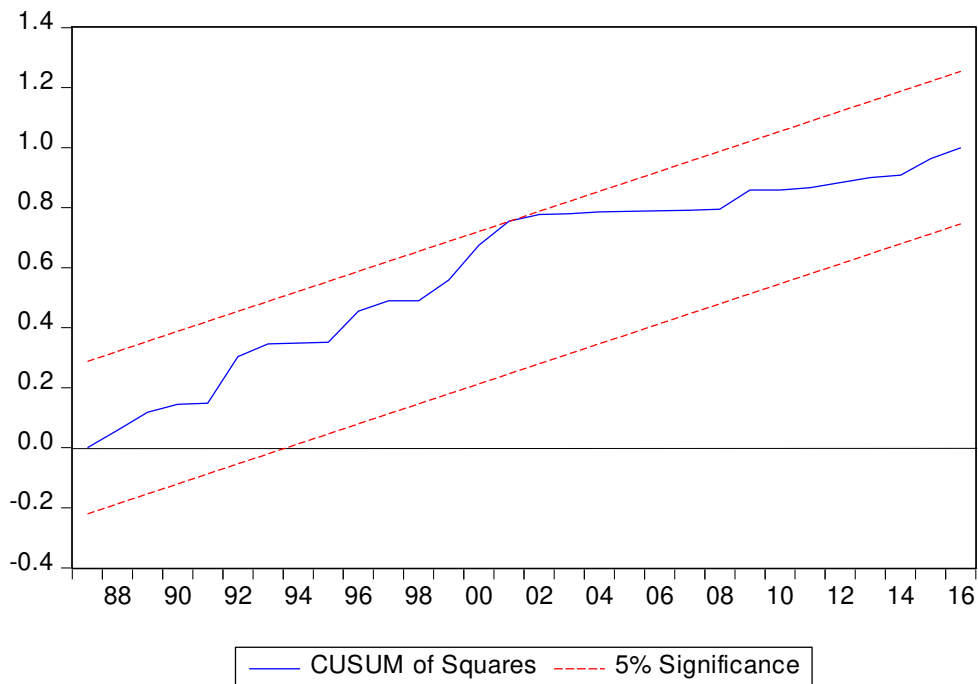


Figure 2: Plot of Cumulative sum of squares of recursive residuals



5. CONCLUSION

The main objective of this study was to investigate the impact of taxes on economic growth of South Africa. Autoregressive Distribution Lag (ARDL) approach to co-integration was used to find the short and long run relation among the variables for the period of 1981 to 2016. The results indicated that the impact of taxes on economic growth is negative and significant in the short and long-run. This was also confirmed by Atems (2015), Stoilova (2017) and Badri and Allahyari (2013). The results furthermore show that there is a positive relationship between trade openness and economic growth in the short and long-run. However, the results show a positive relationship between capital and economic growth in the long-run but shows a negative relationship in the short run

Most of the previous studies also find the negative and significant relationship between taxes and economic growth. The government should realise effective macro-economic policies along with momentous improvements in the structure and functioning systems of governance for stabilising economic growth, such as tax policy changes. According to the results, it would be vital important to decrease indirect taxes and to increase the direct taxes in order to give rise to economic growth in South Africa. Furthermore, to stimulate economic growth in South Africa,

the government should urgently plan to broaden the tax base. South African government should ensure favourable tax rates that are sufficient to generate enough revenue to finance human capital development and infrastructure development.

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